



(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:
05.11.2008 Bulletin 2008/45

(51) Int Cl.:
H01M 8/02 ^(2006.01)

(43) Date of publication A2:
17.07.2002 Bulletin 2002/29

(21) Application number: **01130533.1**

(22) Date of filing: **21.12.2001**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE TR
Designated Extension States:
AL LT LV MK RO SI

- **Leib, Markus**
86485 Eisenbrechtshofen (DE)
- **Hengl, Rüdiger**
86415 Mering (DE)
- **Yamamoto, Tetsu**
Kawagoe-shi,
Saitama 350-0044 (JP)

(30) Priority: **10.01.2001 US 757501**

(71) Applicant: **SGL Carbon AG**
65203 Wiesbaden (DE)

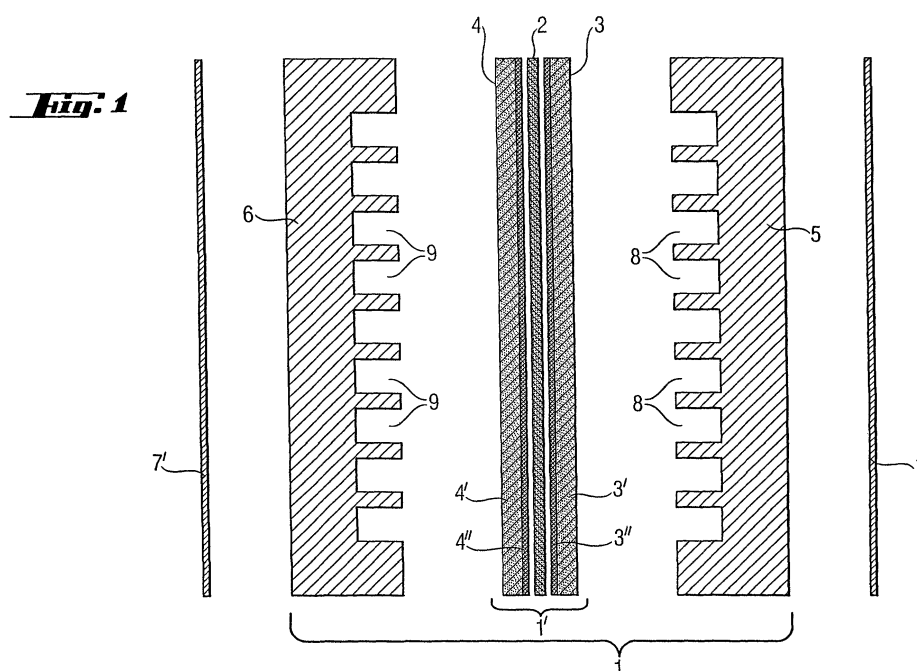
(74) Representative: **Deckers, Hellmuth Alexander**
European Patent Attorney,
Bahnhofstrasse 26/A
55218 Ingelheim (DE)

(72) Inventors:
• **Trapp, Victor, Dr.**
86159 Augsburg (DE)

(54) **Bipolar plates for fuel cell stacks**

(57) Bipolar plates (516) for electrochemical cells, particularly low-temperature fuel cells, with surface modification to enhance through-plate conductivity, processes for improving the surface properties of those bipolar

plates, and fuel cell assemblies made with such plates. Graphite-polymer composite bipolar plates with high bulk conductivity are subjected to an abrasive surface treatment to improve the surface contact as well as the reactant transfer to the adjacent gas diffusion electrodes.





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 01 13 0533

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
D,X	EP 0 949 704 A (NISSHIN SPINNING [JP]) 13 October 1999 (1999-10-13) * paragraphs [0012], [0019] - [0021], [0028] - [0034] * * claims 1-3 * * table 1 *	1-18	INV. H01M8/02
X	EP 0 933 825 A (TOYOTA MOTOR CO LTD [JP]) 4 August 1999 (1999-08-04) * paragraphs [0044], [0058] * * claims * * figures 1,8 *	1-18	
X	GB 1 547 156 A (ORONZIO DE NORA IMPIANTI) 6 June 1979 (1979-06-06) * page 2, lines 49-62 * * page 3, lines 51-73 *	1-18	
A	US 6 096 450 A (WALSH MICHAEL M [US]) 1 August 2000 (2000-08-01) * column 8, lines 20-31; figure 5 * * claims 1,22,24 *	1-18	TECHNICAL FIELDS SEARCHED (IPC)
A	US 3 634 569 A (EMANUELSON ROGER C ET AL) 11 January 1972 (1972-01-11) * figures * * table II * * claim 1 *	1-18	H01M
A	GB 2 039 954 A (GEN ELECTRIC) 20 August 1980 (1980-08-20) * page 1, lines 5-26,53-62 * * tables III,IV *	1-18	
A	JP 10 189011 A (AISIN SEIKI) 21 July 1998 (1998-07-21) * abstract *	1-18	
		-/--	
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 30 September 2008	Examiner Riba Vilanova, Marta
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

2
EPO FORM 1503 03/82 (P04C01)



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 01 13 0533

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	JP 09 055215 A (KYOCERA CORP) 25 February 1997 (1997-02-25) * abstract *	1-18	
A	----- GB 850 045 A (GOODYEAR TIRE & RUBBER) 28 September 1960 (1960-09-28) * page 2, line 122 - page 3, column 32 * * claims * * figures *	1-18	
A	----- US 5 107 629 A (BOYD ALAN L [US] ET AL) 28 April 1992 (1992-04-28) * figures 2,3 * * column 4, line 49 - column 5, line 66 * * claims 1,2 * -----	1-18	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
Place of search		Date of completion of the search	Examiner
The Hague		30 September 2008	Riba Vilanova, Marta
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

2

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 01 13 0533

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

30-09-2008

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
EP 0949704	A	13-10-1999	CA	2268423 A1	10-10-1999
			DE	69922289 D1	05-01-2005
			DE	69922289 T2	04-05-2005
			JP	11297338 A	29-10-1999
			US	6348279 B1	19-02-2002

EP 0933825	A	04-08-1999	CA	2259748 A1	19-07-1999
			JP	4000651 B2	31-10-2007
			JP	11204120 A	30-07-1999
			US	2002004156 A1	10-01-2002

GB 1547156	A	06-06-1979	CA	1103206 A1	16-06-1981
			IT	1077612 B	04-05-1985
			JP	1153509 C	30-06-1983
			JP	53102278 A	06-09-1978
			JP	57042157 B	07-09-1982
			US	4197178 A	08-04-1980

US 6096450	A	01-08-2000	NONE		

US 3634569	A	11-01-1972	CA	930123 A1	17-07-1973
			JP	50011355 B	30-04-1975

GB 2039954	A	20-08-1980	DE	2951964 A1	17-07-1980
			FR	2445861 A1	01-08-1980
			IT	1126670 B	21-05-1986
			JP	1504686 C	13-07-1989
			JP	55115980 A	06-09-1980
			JP	63049755 B	05-10-1988
			US	4214969 A	29-07-1980

JP 10189011	A	21-07-1998	NONE		

JP 9055215	A	25-02-1997	JP	3323038 B2	09-09-2002

GB 850045	A	28-09-1960	NONE		

US 5107629	A	28-04-1992	NONE		

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82